

U.S. Patent Application Serial No. 10/608,295
Reply to Office Action dated November 18, 2004

REMARKS

Favorable reconsideration of this application is requested in view of the above amendments and the following remarks. Claims 1 and 3 are hereby amended.

The amendment of claim 1, reciting that the first semiconductor chip and the second semiconductor chip are electrically connected by bumps, is supported, for example, by Figure 1 and page 12, lines 23-32 of the specification. The amendment of claim 3, reciting that the bumps are formed from Ag, Au, Cu, or solder, is supported by page 11, lines 8-9 of the specification. No new matter is added.

Please note that the election with traverse, of claims 1-12, was made in order to retain the future possibility of reinstating the non-elected claims (claims 13-19). The Office Action Summary does not list claims 13-19 as being withdrawn. Please list them as withdrawn in future communication.

Claims 1, 3, 5, 6, and 9 were rejected as being anticipated by Lee (US 6,583,502). Applicants traverse this rejection. Claim 1 requires that "the first semiconductor chip is directly and electrically connected to bumps and a second semiconductor chip provided immediately below the first semiconductor chip is directly and electrically connected to the bumps". Lee teaches a semiconductor device that requires two interposer substrates (120 and 120') that are connected to bumps (150). Each of the two die (130 or 130') then is mounted to the outer surface (124 or 124') of their respective substrate (120 or 120') via a wire (140 or 140'). See Lee, column 5, lines 21-45 and Figure 1(b). In contrast, claim 1 requires two chips that are directly connected to each other by bumps. The stacked chips are mounted on one substrate. This allows the semiconductor device to be more compact than chip-on-chip devices known in the art at the time of the invention. The minimal height provided by the current invention allows for a smaller semiconductor package as well as improved package density.

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Further, claim 1 requires that "the encapsulation resin layer is formed so that at least a surface of the first semiconductor chip opposite to the surface on which the circuit is formed and a part of side surfaces of the first semiconductor chip are exposed to the outside of the encapsulation resin layer". Lee does not suggest that the resin layer is formed to expose the side surfaces of the first semiconductor chip. Rather, Lee teaches encapsulating the entire side surfaces of the upper semiconductor chip (130'). Therefore, the semiconductor device according to claim 1 can achieve superior heat dissipation characteristics to those provided by a semiconductor device of Lee.

Favorable reconsideration of claims 1, 3, 5, 6, and 9 is requested. Claims 3, 5, 6, and 9 depend from claim 1.

Claims 2 and 4 were rejected as being unpatentable over Lee in view of LoBianco (US 6,340,846). Applicants traverse this rejection. LoBianco does not remedy the deficiencies of Lee as previously noted. The applicants are not conceding the correctness of the rejection as applied to claims 2 and 4. Favorable reconsideration of claims 2 and 4 is requested.

Claim 7 was rejected as being unpatentable over Lee in view of Knapp (US 5,900,669). Applicants traverse this rejection. Knapp does not remedy the deficiencies of Lee as previously noted. The applicants are not conceding the correctness of the rejection as applied to claim 7. Favorable reconsideration of claim 7 is requested.

Claim 8 was rejected as being unpatentable over Lee, in view of Knapp, and further in view of Glenn (US 6,433,277). Applicants traverse this rejection. Glenn does not remedy the deficiencies of Lee and Knapp as previously noted. The applicants are not conceding the correctness of the rejection as applied to claim 8. Favorable reconsideration of claim 8 is requested.

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Claim 10 was rejected as being unpatentable over Lee in view of Carson (US 5,701,233). Applicants traverse this rejection. Carson does not remedy the deficiencies of Lee as previously noted. The applicants are not conceding the correctness of the rejection as applied to claim 10. Favorable reconsideration of claim 10 is requested.

Claims 11 and 12 were rejected as being unpatentable over Lee in view of Bernier (US 6,069,023). Applicants traverse this rejection. Bernier does not remedy the deficiencies of Lee as previously noted. The applicants are not conceding the correctness of the rejection as applied to claims 11 and 12. Favorable reconsideration of claims 11 and 12 is requested.

In view of the above, favorable reconsideration in the form of a notice of allowance is requested. Any questions regarding this communication can be directed to the undersigned attorney, Douglas P. Mueller, Reg. No. 30,300, at (612)371-5237.

Respectfully submitted,

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By

A handwritten signature in black ink, appearing to read "DPM", written over a horizontal line.

Douglas P. Mueller
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DPM:mfe